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This study determined (1) effect of high school bookkeeping on college accounting performance, (2) relationship of performance to potential measured by SCAT, (3) influence of first on subsequent study. For number one, five factors were studied (1) whether bookkeeping was taken in high school, (2) at which high school, (3) how many courses, (4) grades made, (5) time between bookkeeping and accounting. For number two, the student's SCAT scores were determined. For number three, four factors were studied (1) grade distributions in accounting courses, (2) variation in grading by different teachers, (3) student's consistency of performance in sequential classes. The conclusions were (1) the high school attended bore scant relation to college accounting success, (2) of those with or without bookkeeping in high school, the same proportion took accounting, (3) the amount of bookkeeping taken did not affect college course selection, (4) higher ability students were more likely to wait for college accounting, (5) accounting grades were the same for those with or without bookkeeping, (6) as the number of bookkeeping courses increased, the number of college accounting withdrawals decreased, (7) bookkeeping grades were related to grades in introductory accounting, but not in advanced accounting, (8) SCAT scores predicted performance inadequately, (9) best indicator of success in an accounting class was success in a previous accounting class, (10) those who enrolled directly in a second class did better than those who waited a semester or two. (HH)

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COLLEGE OF SAN MATEO

RESEARCH REPORT

1968-5

FACTORS THAT AFFECT PERFORMANCE IN ACCOUNTING CLASSES

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UNIVERSITY OF CALIF.
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FACTORS THAT AFFECT PERFORMANCE IN ACCOUNTING CLASSES

INTRODUCTION

The performance of students in Accounting classes at College of San Mateo has been subject to considerable variation. In some instances the number of students who withdraw is higher than expected, while in other cases the students earn grades that are lower than one would expect. Basically, the solution to such a problem can be approached in two ways. One involves the way students are taught, while the other involves the capabilities the student brings to the Accounting class. In either event, one must first identify variables which could account for the student's performance, and the assessment of such variables is the subject of this study.

STUDY PURPOSE

This study was designed to identify some of the factors which could influence a student's performance in Accounting classes. Essentially, this was an exploratory study, seeking insight into possible causes of poor performance with the expectation that it would serve as an aid to the counselors of students entering Accounting classes and to teachers of Accounting.

OBJECTIVES

1. To determine the influence of a student's high school experience upon his subsequent performance.
2. To describe the relationship between student potential, as measured by standardized test scores, and performance
3. To describe the influence of Accounting study upon subsequent performance in Accounting.

PROCEDURE

Under the direction of Mr. Louis Yaeger, Chairman of the Business Division, certain factors that might influence a student's performance in Accounting were selected for study. The variables were discussed by Mr. Bernard Woods and members of the Accounting Committee, and a machine card type of questionnaire was designed. The information was collected by the Business Division for machine analysis. The specific factors analyzed in this study included:

A. High School Experiences
   1. Enrollment in High School Bookkeeping
   2. High School attended
   3. Bookkeeping courses completed
   4. Achievement in Bookkeeping
   5. Time between completion of Bookkeeping and enrollment in college Accounting.

B. Student Potential (School-College Ability Test - S.C.A.T.)
   1. S.C.A.T. verbal score
   2. S.C.A.T. quantitative score
   3. S.C.A.T. total score

C. College of San Mateo Accounting Experience
   1. Grade distributions
   2. Instructor's grading patterns

3. Consistency of performance in sequential accounting classes
4. Time lapse between completion of the first and entrance into the second sequential College of San Mateo Accounting classes

FINDINGS

Students included in this study came from many different high schools; but the high schools claiming the largest representation among the 1284 students surveyed were: Hillsdale (98 students), Serra (86 students), Menlo-Atherton (75 students), Carlmont (73 students), and Aragon (70 students). Enrollment in accounting classes by these students is shown in Table I. Generally, the proportion of students who enrolled or who did not enroll in General Accounting 66 from each high school was the same. Exceptions were Jefferson and Notre Dame high schools in that the proportion taking General Accounting 66 was much higher than expected; however, students from these high schools then enrolled in Accounting 1A and 1B at a much lower rate than did other students. It was also noted that the students from Half Moon Bay and Terra Nova high schools enrolled in Accounting 1B at a somewhat lower rate than students from other high schools, although a relatively low number of students from any high school took Accounting 1B. In fact, only one student in five took Accounting 1B, which was an enrollment decrease of 75 percent from the enrollment in Accounting 1A. Thus, it could be said that enrollment in any level of accounting was not related to the high school the student attended.

A related question concerned the difference in achievement of students from the various high schools. In terms of grades earned in General Accounting 66, it was found that at least one-half or more of the students from Burlingame, Half Moon Bay, and Mills earned A and B grades, while forty percent from Capuchino, El Camino, and Terra Nova who enrolled in Accounting 66 earned D or F grades. There were no differences in withdrawal rates from General Accounting 66 among the various high schools represented.

TABLE I - THE PERCENTAGE OF STUDENTS FROM EACH HIGH SCHOOL ENROLLED IN EACH COLLEGE ACCOUNTING CLASS

HIGH SCHOOL	Total Number	Enrolled in Accounting 66		Enrolled in Accounting 1A		Enrolled in Accounting 1B	
		Yes	No	Yes	No	Yes	No
Aragon	71	30%	70%	78%	22%	15%	85%
Burlingame	50	20	80	84	16	26	74
Capuchino	58	30	70	74	26	26	74
Carlmont	73	40	60	70	30	16	84
El Camino	17	39	61	76	24	24	76
Half Moon Bay	9	44	56	67	33	11	89
Hillsdale	98	33	67	77	23	15	85
Jefferson	29	62	38	52	48	10	90
Menlo-Atherton	52	27	73	83	17	31	69
Mills	75	24	76	84	16	24	76
Oceana	5	100	-	40	60	20	80
Pescadero	2	50	50	100	-	50	50
Ravenswood	15	27	73	87	13	13	87
San Carlos	56	29	71	82	18	25	75
San Mateo	67	42	58	72	28	21	79
S San Francisco	45	27	73	76	24	11	89
Sequoia	59	39	61	73	27	24	76
Terra Nova	13	46	54	62	38	8	92
Westmoor	42	40	60	74	26	14	86
Woodside	65	20	80	86	14	25	75
Notre Dame	13	62	38	45	55	-	100
Serra	86	21	79	87	13	22	78
All Others	252	27	73	78	22	22	78
TOTAL	1251	31%	69%	77%	23%	21%	79%

Achievement by high school in Accounting 1A classes only (since it attracted the largest number of students) is shown in Table II. It will be noted that a larger proportion of students from Burlingame, Menlo-Atherton, San Carlos and Sequoia high schools earned A and B grades in Accounting 1A than students from other high schools. However, the high

schools from which the proportion of students who earned fewer C or better grades than expected (in relation to other high schools) were Jefferson, Ravenswood and Westmoor. Conversely, the proportion of students from El Camino, Ravenswood and Westmoor who earned D or F grades was somewhat higher than expected. Apparently, Jefferson did not fall in this latter

TABLE II - ACCOUNTING 1A GRADES BY HIGH SCHOOL

HIGH SCHOOL	Total Students	Percent "A--B"	Percent "C"	Percent "D--F"	Percent "W"
Aragon	55	13%	33%	35%	20%
Burlingame	42	26	33	29	12
Capuchino	43	21	28	37	14
Carlmont	51	16	39	35	10
El Camino	13	23	23	54	-
Half Moon Bay	6	16	50	34	-
Hillsdale	75	20	27	43	11
Jefferson	15	13	13	40	33
Menlo-Atherton	43	23	44	16	16
Mills	64	19	42	25	14
Ravenswood	13	-	23	54	23
San Carlos	45	22	36	31	11
San Mateo	48	15	30	38	17
S San Francisco	34	9	47	29	15
Sequoia	43	23	26	30	21
Westmoor	31	6	26	55	16
Woodside	56	12	30	34	23
Serra	75	7	32	51	9
All Others	240	17	37	35	17
CSM 1A Grading Pattern	992	16%	32%	36%	16%

category because a somewhat larger proportion of its students withdrew from Accounting 1A. (These findings do not apply to all students from any of the high schools; instead, they reflect general trends.)

It was clear that the high school attended by a student was not an adequate prediction, in itself, of performance in Accounting 1A.

Students from Burlingame and Woodside high schools tended to earn more A and B grades in CSM Accounting 1B than students from other high schools. However, there were too few students from any given high school enrolled in Accounting 1B to provide meaningful differences between the high schools. One potential approach to differences in performance among students from various high schools was the number who repeated accounting courses. Approximately nine percent of all students in the study repeated one or more accounting courses, but there were no differences in this regard between students from the high schools represented.

Another question assessed at this point was whether the withdrawal rate of students from any of the accounting courses was higher or lower among students from the different high schools. In terms of General Accounting 66, there were 20 students who withdrew during the semesters under study, but the proportion was nearly the same for each high school. There were 140 students who withdrew from Accounting 1A; and Woodside and Jefferson students tended to have a larger proportion of withdrawals than the other high schools. There were 33 students who withdrew from Accounting 1B, and the proportion of withdrawals was similar for all high schools.

The final question posed regarding the possible differences among students from the various high schools had to do with the pattern of accounting courses taken at the College by students who had taken high school bookkeeping as opposed to those who had not taken high school bookkeeping. Table III shows that there were no differences in the course pattern of students who had taken high school bookkeeping as opposed to those who had not taken it. There were 421 students (33 percent) who had completed one or more bookkeeping courses in high school. Approximately one-third of the students who had taken bookkeeping in high school then enrolled in General Accounting 66, two-thirds took Accounting 1A, and one-fourth completed Accounting 1B.

TABLE III - COLLEGE ACCOUNTING COURSES TAKEN BY STUDENTS WHO DID AND DID NOT TAKE HIGH SCHOOL BOOKKEEPING

COLLEGE ACCOUNTING PATTERN	Took High School Accounting #	Took High School Accounting %	NO High School Accounting #	NO High School Accounting %
Accounting 66 only	95	23.8%	180	20.6%
Accounting 66 AND 1A	31	7.7%	60	6.9%
Accounting 1A only	196	49.0%	455	52.0%
Accounting 1A, AND 1B	78	19.5%	163	18.6%
Accounting 66, 1A AND 1B	--	0.0%	17	1.9%
T O T A L	400	100.0 %	875	100.0 %

On the other hand, 27 percent of those who had not taken high school bookkeeping enrolled in General Accounting 66, 78 percent completed Accounting 1A, and 20 percent completed Accounting 1B. In effect, there were no differences between the number of students who enrolled in Accounting 66, Accounting 1A, and 1B who had or had not taken bookkeeping in high school. Moreover, even those students who had taken more than one bookkeeping course in high school were just as likely to be enrolled in each college accounting course as those who had taken only one bookkeeping course in high school.

Considering General Accounting 66 only, it was noted that the proportion of students earning any letter grade, except C, was the same regardless of whether they had taken bookkeeping in high school. In terms of C grades, however, 21 percent of those who had taken high school bookkeeping earned a C grade, while 32 percent of those who had not taken high school bookkeeping earned a C grade. Moreover, the probability of earning an A grade in General Accounting 66 increased as the number of high school bookkeeping classes a student had completed increased. Conversely, F grades tended to increase as the number of high school bookkeeping courses decreased. There were no marked differences in terms of other General Accounting grades and the number of high school courses completed by a student.

Table IV approaches this same question, but it indicated that experience in high school bookkeeping classes had little or no effect on the students' letter grade in Accounting 1A. The only difference that did exist was that students who had no high school bookkeeping tended to withdraw from Accounting 1A at a greater rate than did other students. A similar table was prepared for Accounting 1B and in general, students who had not taken high school bookkeeping tended to earn higher grades. However, there was the same proportion of C grades earned in Accounting 1B by students who had taken bookkeeping in high school as by those who had not taken high school bookkeeping.

TABLE IV - HIGH SCHOOL BOOKKEEPING EXPERIENCE AND COLLEGE ACCOUNTING 1A GRADES

ACCOUNTING 1A LETTER GRADE	Number of High School Bookkeeping Courses Taken							
	None		One		Two		Three or More	
	#	%	#	%	#	%	#	%
A	27	4.0%	1	2.9%	5	2.5%	8	9.1%
B	80	11.9	5	14.3	23	11.6	12	13.6
C	210	31.4	13	37.1	68	34.4	29	32.9
D	105	15.6	7	20.0	40	20.2	16	18.2
F	121	18.0	4	11.4	43	21.7	19	21.7
W	128	19.1%	5	14.3%	19	9.6%	4	4.5%
TOTAL	671	100	35	100	198	100	88	100

Another high school experience factor considered in the study was the grades in bookkeeping. To equate the differences between students in terms of the number of courses taken in high school, a bookkeeping grade point average was calculated. The grade point averages were then labeled with a letter grade to facilitate their presentation. Students enrolled in Accounting 66 were more likely to have earned a C grade average or below in high school than students who did not take Accounting 66. Table V shows the relationship between high school bookkeeping grade point average and college accounting grade.

TABLE V - RELATIONSHIP BETWEEN GRADES IN HIGH SCHOOL BOOKKEEPING AND COLLEGE ACCOUNTING GRADES

	Percent Earning Each High School Grade				
College Grades	A	B	C	D	F
Accounting 66 (r = .56)					
A	46	21	2	-	33
B	38	46	20	13	-
C	8	24	37	10	-
D	-	6	26	45	-
F	-	-	9	16	67
W	8	3	6	16	-
Accounting 1A (r = .34)					
A	9	3	4	-	-
B	28	10	11	-	-
C	39	36	33	30	20
D	13	22	19	18	20
F	6	19	26	40	40
W	5	10	7	12	20
Accounting 1B (r = .18)					
A	4	6	-	-	-
B	11	3	-	-	-
C	38	31	50	-	-
D	25	12	25	-	-
F	18	27	25	-	-
W	4	21	-	-	-

The relationship between high school bookkeeping grade point average and college performance in General Accounting 66 was .56, the correlation between high school bookkeeping grades and Accounting 1A was .34, and the correlation between high school bookkeeping grades and Accounting 1B was .18. In effect, Table V shows, as do the above correlation coefficients, that high school bookkeeping grades are reasonably well related to grades in Accounting 66, somewhat related to Accounting 1A grades, and poorly related to grades in Accounting 1B.

Specifically, in terms of Accounting 1A, it was found that 76 percent of the students with an A average in high school bookkeeping received a C grade or above in college; and 49 percent of the students with a high school grade of B in bookkeeping earned a C grade or above in college Accounting 1A, as did 48 percent of the students with a C grade, and 30 percent of the students with a D grade. A comparison of performance in college Accounting 1B related that 53 percent of the A students in high school bookkeeping earned a C grade or better, and also 40 percent of the high school B students earned grades of C or better in Accounting 1B. It would appear that students who earned an A, B, or C grade average in high school bookkeeping would have better than a 50-50 chance of attaining a C grade in college accounting. It may also be said that the probability of a student enrolling in Accounting 1A or 1B increased as his high school bookkeeping grade average increased.

Generally, the probability of a student repeating a college accounting course could not be related to his performance in high school bookkeeping. At the same time, the pattern of college accounting courses, as was inferred above, was related to his high school bookkeeping grade average. Specifically, students with an A grade average in high school bookkeeping were twice as likely as any other students to enroll in both Accounting 1A and 1B. Conversely, students with a C average tended to complete only Accounting 66. However, it may be that a case could be made for course enrollment being a function of counseling rather than the student's grade average since one is a function of the other. The point, however, is that high school bookkeeping grade point average will account for approximately one-half the variance in predicting college accounting enrollment patterns and grades.

The fourth and final high school experience factor considered in this study was the influence, if any, of the amount of time between high school bookkeeping course work and when the student enrolled in college accounting courses. However, it was found that the passage of time did not influence subsequent performance. Students who entered college accounting the fall semester after graduating from high school earned no better or worse grades than those students who waited several years before taking an accounting course; neither was the pattern of courses selected or withdrawal rate influenced by the passage of time since taking bookkeeping in high school.

The second objective of this study was to assess the influence, if any, that a student's potential might have on his performance in accounting. Potential in this case was defined as the student's verbal and quantitative ability and was measured by the School and College Ability Test (SCAT). Correlations between each of the SCAT subtests and the student's course grade points were calculated as indicators of the overall relationship. Generally, these relationships could be described as positive, but of limited practical significance. It would appear that the SCAT quantitative or total score would be the better predictor (compared to the verbal score) of subsequent grades, especially in Accounting 1B. In any event, these relationships were at about the same level as most coefficients between standardized test scores and grade point averages. Such tests serve best as one of many indicators of a student's performance, and their use must take into account the standard error involved. For this reason as well as other reasons, a regression equasion was calculated and reported as the last step in the findings.

SCAT verbal score and Business 66 grades	.44
SCAT verbal score and Business 1A grades	.37
SCAT verbal and Business 1B grades	.45
SCAT quantitative and Business 66 grades	.44
SCAT quantitative and Business 1A grades	.44
SCAT quantitative and Business 1B grades	.59
SCAT Total score and Business 66 grades	.46
SCAT Total score and Business 1A grades	.44
SCAT Total score and Business 1B grades	.57

Table VI shows the proportion of students with certain verbal percentiles and grades they earned. It would appear that the verbal score was not indicative of success in General Accounting 66. For example, 48 percent of the students who scored below the 10th percentile (91 students in the general population have a higher verbal ability score) received a C grade or better, while 29 percent of the students who scored at or above the 80th percentile earned a D grade. At the same time, however, it can be said that at least two thirds of the students at or above the 20th percentile will earn a C letter grade or better.

TABLE VI - THE INFLUENCE OF SCAT VERBAL SCORES
UPON GRADES EARNED IN ACCOUNTING CLASSES

SCAT VERBAL TEST PERCENTILES	Percent of Students Earning Each Letter Grade A	B	C	D	F	Total Students
Accounting 66						
Under 10	4%	16%	28%	24%	28%	25
Between 10 - 19	7	15	33	25	20	59
Between 20 - 29	4	29	32	21	14	28
Between 30 - 39	6	27	28	26	13	82
Between 40 - 59	21	29	37	8	5	62
Between 60 - 79	10	32	36	17	5	58
Between 80 - 99	21%	29%	21%	29%	-	14
Accounting 1A						
Under 10	-	5%	20%	40%	35%	20
Between 10 - 19	-	8	37	27	28	74
Between 20 - 29	-	7	31	43	19	42
Between 30 - 39	5	7	36	29	23	122
Between 40 - 59	1	16	35	18	30	147
Between 60 - 79	7	15	44	16	18	251
Between 80 - 99	7	24	41	10	18	143
Accounting 1B						
Under 10	-	-	33	-	67	3
Between 10 - 19	11	-	32	41	16	19
Between 20 - 29	-	12	13	50	25	8
Between 30 - 39	-	7	49	17	27	30
Between 40 - 59	-	16	39	24	21	38
Between 60 - 79	4	12	39	22	23	74
Between 80 - 99	8%	22%	38%	24%	8%	49

In effect, there was a 50 percent probability that a student who scored below the twentieth percentile would earn a D or F grade in Accounting 66, or that his grade would be a C grade or above.

As may be seen in Table VI, the verbal portion of the SCAT was somewhat more predictive of grades earned in Accounting 1A. Two-thirds of the students who scored at or above the 50th percentile earned a C letter grade or better, while forty percent of those scoring below the 50th percentile earned a C grade or better. It was also noted that 75 percent of the students with a SCAT verbal score below the tenth percentile earned D or F grades in Accounting 1A, as did 50 percent of the students with verbal percentiles between ten and fifty-nine; while 30 percent of the students with verbal percentiles above sixty earned D or F grades. Essentially, students with verbal percentiles above thirty have a 50-50 chance of earning a C grade or better in Accounting 1A. Basically, the findings for Accounting 1B were very similar to those noted for 1A. The primary difference was that D and F grades had a lower relationship to the student's SCAT verbal score. It was seen that the SCAT verbal score did not clearly indicate which students would withdraw from courses or repeat courses.

The specific relationship between scores on the SCAT quantitative subtest and the student's accounting grades was described through Table VII. It was found that students who score below the 10th percentile have a 50-50 chance of earning a C grade or better in Accounting 66, while it is very unlikely that they will earn a C grade or better in Accounting 1A or 1B. In fact, a student who scored at the 30th percentile on the quantitative portion of SCAT had less than a 50-50 chance to earn a C grade or better in Accounting 1A, while a score of at least 40% was needed to have a 50-50 chance of earning at least a C grade in Accounting 1B. This study clearly shows that the SCAT quantitative score was the single best test score prediction of college accounting grades.

TABLE VII - THE INFLUENCE OF SCAI QUANITIATIVE SCORES UPON ACCOUNTING GRADES

SCAT QUANTITATIVE PERCENTILES	Percent of Students Earning Each Letter Grade					Total Students
	A	B	C	D	F	
Accounting 66						
Under 10	6%	18%	29%	12%	35%	17
10 - 19	2	14	43	27	14	51
20 - 29	7	26	32	19	16	57
30 - 39	13	23	35	21	8	61
40 - 59	8	36	28	18	10	60
60 - 79	22	22	26	21	9	58
80 - 99	18	36	25	14	7	28
Accounting 1A						
Under 10	-	-	14	29	57	14
10 - 19	-	3	26	28	43	39
20 - 29	3	10	26	33	28	78
30 - 39	1	10	36	34	19	93
40 - 59	5	11	42	20	22	191
60 - 79	6	18	39	15	22	228
80 - 99	6	23	46	11	14	155
Accounting 1B						
Under 10	-	-	-	100	-	1
10 - 19	-	-	25	25	50	4
20 - 29	-	-	23	46	31	13
30 - 39	-	-	32	27	41	22
40 - 59	4	8	41	26	21	53
60 - 79	5	12	42	23	18	65
80 - 99	6%	27%	40%	17%	10%	63

The relationship between total SCAT scores and subsequent grades in accounting was shown in Table VIII. Once again, SCAI total scores were of limited value in predicting success in Accounting 66. That is, over 50 percent of the students taking Accounting 66 earned a C grade or better regardless of their total SCAT score. On the other hand, students who scored

below the thirtieth percentile have at least a two-fifths probability of earning a D or F grade, while those who scored above the 40th percentile have a one-fifth probability of earning a D or F grade.

TABLE VIII - THE INFLUENCE OF SCAT TOIAL SCORES UPON ACCOUNTING GRADES

SCAT TOTAL PERCENTILES	Percent of Students Earning Each Letter Grade					Total Students
	A	B	C	D	F	
Accounting 66						
Under 10	4%	12%	44%	12%	28%	25
10 - 19	4	19	26	32	19	47
20 - 29	4	20	35	24	17	83
30 - 39	15	36	34	15	-	41
40 - 59	16	26	34	16	8	73
60 - 79	23	33	23	10	10	39
80 - 99	17	31	26	26	-	23
Accounting 1A						
Under 10	-	-	14	36	50	22
10 - 19	-	2	33	25	40	40
20 - 29	-	8	30	38	24	91
30 - 39	1	12	39	28	20	69
40 - 59	4	10	39	20	27	179
60 - 79	6	18	40	20	16	196
80 - 99	8	22	43	9	18	202
Accounting 1B						
Under 10	-	-	50	50	-	2
10 - 19	-	-	11	44	45	9
20 - 29	-	-	33	50	17	12
30 - 39	5	-	43	26	26	19
40 - 59	2	8	37	20	33	49
60 - 79	3	14	41	21	21	58
80 - 99	7%	24%	40%	22%	7%	72

Table VIII indicates that over 50 percent of the students who scored below the 30th percentile on the SCAT Total score earned D or F grades in Accounting 1A, while two thirds of the students who scored below the 30th percentile earned D or F grades in Accounting 1B. Thus, as the student's percentile score increased, the probability of A or B grades increased, and the probability of D or F grades decreased.

It was determined that repeating courses was not related to the student's SCAT score. The proportion of students who repeated and who did not repeat accounting courses was the same regardless of their SCAT scores. At the same time, as the total SCAT score increased, the proportion of students who had taken bookkeeping in high school decreased. For example, 28 percent of the students who had taken high school bookkeeping scored above the 60th percentile, while 48 percent of the students who had not taken high school bookkeeping had scores above the 60th percentile. It would appear that, in general, the students with higher ability took accounting in college rather than in high school.

The third objective of this study was to identify and describe experiences in accounting at college that might influence a student's grade. To provide a basis for this portion of the study, however, it was first necessary that the distribution of grades in each of the several courses be examined. Table IX shows that the proportion of students who earned a given letter grade remained at about the same rate each semester. For example, approximately one-third of the Accounting 1A students received a D or F letter grade each semester. There were a few exceptions, however, such as during the spring of 1965, C letter grades decreased and D grades increased in comparison to other semesters. In addition, there were more W grades during the spring semester 1964 than during the other semesters. It must be concluded, however, that the distribution of letter grades during each semester was approximately the same.

TABLE IX

DIFFERENCES IN ACCOUNTING 1A GRADE DISTRIBUTIONS BETWEEN SEMESTERS

GRADES	Fall '63		Spring '64		Fall '64		Spring '65		Fall '65	
	#	%	#	%	#	%	#	%	#	%
A	4	4%	4	3%	13	5%	5	3%	15	5%
B	13	14	16	12	35	12	25	15	31	10
C	35	38	45	35	96	34	36	22	107	34
D	19	20	12	9	48	17	43	26	46	14
F	12	13	24	19	52	18	27	16	72	22
W	10	11	28	22	40	14	30	18	47	15
TOTAL	93	100%	129	100%	284	100%	166	100%	318	100%

To further identify the college experiences that might influence a student's grades in accounting, an attempt was made to learn whether the students of particular instructors in accounting courses differed in the grades they earned. Looking only at the Accounting 66 course, Table X shows that during the two years of the study, students of particular teachers No. 3 and No. 5 (numbers used to retain anonymity) tended to earn more A grades than students taking accounting from other teachers. At the same time, students in the classes of teachers No. 5 and No. 6 earned slightly more F grades in Accounting 66 than did students in classes of other teachers; and students in classes of teacher No. 3 tended to have a higher proportion of W grades. It should be recognized that although these differences could be empirically supported, a precise sameness of grading may not, necessarily, be desirable. The point is that the grading patterns of General Accounting 66 instructors did vary, and whether this was desirable or not desirable was not a question assessed by this study.

TABLE X

PROPORTION OF ACCOUNTING 66 LETTER GRADES GIVEN BY EACH TEACHER

LETTER GRADES	Overall %	Teacher 3 %	Teacher 4 %	Teacher 5 %	Teacher 6 %
A	10%	16%	4%	15%	8%
B	23	24	24	25	19
C	29	27	37	17	34
D	19	8	18	25	19
F	10	--	5	15	14
W	9%	25%	12%	3%	6%
TOTAL STUDENTS	368	37	82	95	154

Accounting 1A grades were examined in the same way and are reported in TABLE XI. With the exception of the grades given by teacher No. 7, the grading patterns of the instructors were very similar. This is clearly reflected in the proportion of F grades and the Accounting 1A grade point average achieved by students in classes of teacher No. 7.

TABLE XI

PROPORTION OF ACCOUNTING 1A LETTER GRADES GIVEN BY EACH TEACHER

LETTER GRADES	Overall %	Teacher 1 %	Teacher 2 %	Teacher 4 %	Teacher 6 %	Teacher 7 %
A	4%	6%	6%	5%	7%	2%
B	12	17	13	17	5	7
C	32	29	36	35	42	25
D	17	15	16	22	10	15
F	19	17	20	5	20	32
W	16%	16%	9%	16%	16%	18%
TOTAL STUDENTS	992	106	154	316	82	336
G.P.A.	1.59	1.75	1.67	1.92	1.65	1.16

It was also evident that students taking classes from teacher No. 4 tended to earn the highest grades, while the withdrawal rate of students from the classes of teacher No. 2 was somewhat lower than the rate found in other classes.

The findings in this regard for Accounting 1B were nearly identical. During the period of time under study, teachers Nos. 1, 2, and 7 taught the majority of these classes. Students in the classes of teacher No. 7 earned a higher proportion of D and F grades, while students in the classes of teacher No. 2 withdrew less frequently on a proportionate basis. Specifically, the average G.P.A. of students taking classes from teacher No. 1 was 1.70; the G.P.A. of students in classes of teacher No. 2 was 1.80; and the G.P.A. of students in classes of teacher No. 7 was 1.23. The performance of students in Accounting 1A who took Accounting 66 was the same for all students regardless of who was the instructor in Accounting 66. Generally, this was also true of the students who took Accounting 1A from one instructor and then took Accounting 1B from the same or another instructor. There was a trend, however, toward more low grades being earned in Accounting 1B by students who had taken Accounting 1A from teacher No. 2 than was the case for other instructors.

The next logical question was: "Did performance in one college accounting class influence the student's performance in subsequent classes?" Generally, students who had not taken Accounting 66 earned as many A, B, or C grades in Accounting 1A as students who had taken Accounting 66. Moreover, Table XII shows the strong relationship (.78 correlation) between the grades earned in both courses. However, relatively few of the students in Accounting 1A had taken Accounting 66. Thus, there were very few cases involved, and the standard error of estimate was quite large. The point is that there appears to be a very strong relationship between grades earned in Accounting 1A and prior performance by the student in Accounting 66, but there were not enough students taking both classes to allow one to draw a definite conclusion.

TABLE XII

THE RELATIONSHIP BETWEEN ACCOUNTING 66 AND ACCOUNTING 1A GRADES -- EXPRESSED BY THE PERCENT OF STUDENTS WHO EARN EACH GRADE

Accounting 66 Grades	Accounting 1A Grades					
	A	B	C	D	F	W
A	67%	27%	14%	6%	42%	4%
B	33%	46%	40%	47%	32%	13%
C	--	27%	37%	41%	11%	30%
D	--	--	9%	6%	10%	35%
F	--	--	--	--	5%	9%
W	--	--	--	--	--	9%
Total Students	3	11	35	17	19	23

Accounting 66 Grades	ACCOUNTING 1A Grades						Total Students
	A	B	C	D	F	W	#
A	17%	25%	42%	8%	--	8%	12
B	3%	13%	36%	20%	20%	8%	39
C	--	8%	37%	19%	17%	19%	36
D	--	--	21%	7%	14%	58%	14
F	--	--	--	--	50%	50%	4
W	--	--	--	--	33%	67%	3

A similar analysis between Accounting 1A and Accounting 1B provided a .85 correlation coefficient between the grades in the two courses. Stated in another way, 100 percent of the eleven A-grade students in Accounting 1A earned a C grade or better in Accounting 1B; 80 percent of the sixty B-grade students in Accounting 1A earned C or above in Accounting 1B, 50 percent of the 120 C-grade students earned a grade of C or better, and 25 percent of the twenty-five D and F-grade students in Accounting 1A earned a C in Accounting 1B. Only 5.7 percent of all students who enrolled in Accounting 66 subsequently took Accounting 1B; and with such small numbers of students involved, useful findings could not be reported.

The possibility that students who repeated accounting courses might earn different grades than those who did not repeat was also considered; but the number of students who repeated was quite small, and meaningful differences in their performance could not be detected. Moreover, students who waited one or more terms after completing Accounting 66 before enrolling in Accounting 1A earned the same grades as students who immediately enrolled in Accounting 1A after completion of Accounting 66. On the other hand, students who enrolled in 1B immediately after completing 1A tended to earn higher grades than those who waited a semester or more

Finally, the ability of any of the individual variables discussed earlier to adequately predict a student's performance in college accounting could be improved by combining those that seemed to be the most predictive. In effect, each variable accounts for a certain amount of the variance in predicting a student's grade. If one selects only those factors that account for the most variance and then adds each bit of variance to the other until one accounts for the most variance, the result is a predictive equation. Such an equation includes only the most predictive variables acting in combination with one another to predict a student's grades. To accomplish this a step-wise regression analysis program was used at the Computer Center of the College. (Note: some variables, such as the instructor, provide nominal data only and can be included in the predictive equation). Equations resulting from this analysis were as follows:

1) $Y = 2.30994 + (-.02058\ X_1) + (-.17189\ X_2) + .15204\ X_3$

where:

Y = General Accounting 66 grade
X_1 = S.C.A.T. Total score
X_2 = High School bookkeeping G.P.A.
X_3 = Semesters since completing high school bookkeeping

2) $Y = 1.66598 + (-101653\ X_1) + .04647\ X_2 + .30554\ X_3 + (-.18646\ X_4) + (-.24749\ X_5)$

where:

Y = Accounting 1A grade
X_1 = S.C.A.T. Verbal Score
X_2 = S.C.A.T. Total Score
X_3 = High School bookkeeping G.P.A.
X_4 = Semesters since high school bookkeeping
X_5 = Grade in Accounting 66

3) $Y = -.40448 + .00856 X_1 + .26832 X_2$

where:

Y = Accounting 1B grade
X_1 = S.C.A.T. Quantitative score
X_2 = Accounting 1A grade

Although these were the "best" equations that the variables in the study would yeild, they still contain more errors than would be desirable; and they fail to account for as much of the variance as would be desired.

The point is that a predictive model can be formed, but whether it would be the best way to improve performance in accounting is open to question.

CONCLUSIONS AND RECOMMENDATIONS

1. The high school a student attended is somewhat related to his subsequent performance in accounting at College of San Mateo. However, knowing the high school attended will not allow one to predict accurately the accounting performance of its students. Instead, it can provide a general indicator that the student may encounter problems in accounting. For example, students from the Jefferson District tended to perform more poorly in Accounting 1A than students from Burlingame, Menlo Atherton, San Carlos, and Sequoia. However, there was no difference noted in the performance of students from the various high schools in Accounting 66 and Accounting 1B.

2. The proportion of students who take bookkeeping in high school and then take any of the college accounting courses is the same as the proportion who did <u>not</u> take bookkeeping in high school. Thus, the pattern of accounting courses taken in college is the same for both those who did and did not take high school bookkeeping. Moreover, the fact that the student had taken more than one high school bookkeeping course did not seem to influence the accounting course selection in college. Whether this occurs because the student is not better prepared by taking more than one high school bookkeeping course or because the College fails to consider this as a factor in placing students is not clear at this time. However, it is

clear that the students with the higher ability are more likely to wait and take accounting in junior college than they are to take bookkeeping in high school.

3. A student who takes bookkeeping in high school will generally earn the same grade in college accounting as the student who does not take high school bookkeeping. High school bookkeeping completion will reduce the probability of lower grades than a C in Accounting 66; otherwise, high school bookkeeping background is poorly related to subsequent performance in college accounting. It may also be concluded that students who take one or more high school bookkeeping courses achieve the same grades in college accounting as students who take no bookkeeping courses in high school. The only difference noted in this regard is that, as the number of high school bookkeeping courses taken increases, the proportion of students who withdraw from college accounting will decrease.

4. High school bookkeeping grades are related to Accounting 66 grades, but the relationship to Accounting 1A and 1B grades is considerably reduced. Students who earn an A or B average in high school bookkeeping have a 90 percent chance of earning a C or better grade in Accounting 66. This probability drops to 60 percent for students who earn C grades in high school bookkeeping, and to 25 percent chance for students who earn D grades in high school bookkeeping. Students who earn A and B grades in high school bookkeeping have a 70 to 75 percent chance of earning a C grade or better in Accounting 1A, while those students with high school grades of C in bookkeeping have a 50-50 chance of earning a C grade or better in Accounting 1A. High school bookkeeping grades will not adequately predict Accounting 1B grades.

5. A S.C.A.T. Verbal score is only somewhat predictive, at best, of a student's performance in accounting. It would appear that students have a 50 percent probability of earning a C grade or better in Accounting 66 if the S.C.A.T. Verbal percentile is above ten. The same 50 percent probability prediction is apparent in that students may earn a C or better grade in Accounting 1A if the S.C.A.T. Verbal score is above 30, and in Accounting 1B with a verbal S.C.A.T. percentile above 40.

These same cut-off scores could also be used for the S.C.A.T. Quantitative score. In fact, they would be preferable since the margin of error would be much lower. These comments and cut-offs would also apply to the S.C.A.I. Total scores, although total scores will contain almost as much error if used to predict a student's accounting grade as would S.C.A.I. Verbal scores. Essentially, the findings suggest that a S.C.A.T. score in itself does not predict adequately the accounting grades, because many students with apparent high potential fail accounting. A key to the improvement in this failure rate may possibly be in improvement of the curriculum and methods of instruction.

6. As previous studies and experiences have already suggested, a student's performance can be related directly to the person teaching a class. Thus, students taking accounting from some teachers earn more A grades than students taking accounting from other teachers. Why and whether this is desirable or not desirable was not assessed in this study. It was noted with some interest, however, that grades in Accounting 1A are <u>not</u> related to teachers of Accounting 66. Moreover, with but one exception, a student's performance in any of the accounting courses is not related to whom he had as an instructor in a previous accounting course.

7. In general, the best indicator of a student's success in college accounting classes is his success in previous college accounting classes. For example, a student who earned an A in Accounting 1A will earn at least a C letter grade in Accounting 1B, while students who completed 1A with a B grade have at least an 80 percent chance of earning a C grade or better in Accounting 1B. The only other factor that seemed to make a difference was that students who enroll in Accounting 1B directly upon completion of 1A will earn higher grades in 1B than those who wait one or more semesters before enrolling in 1B upon completion of Accounting 1A. At the same time, the amount of time lapsed between the completion of Accounting 66 and starting Accounting 1A does not seem to influence a student's subsequent grade in Accounting 1A.

8. A predictive model of a student's probable performance in accounting classes can be formed but its value, based upon the findings from this study, would be questionable. Instead, it would seem that the greatest aid to improve performance in accounting classes would be in an examination of curriculum and instruction. Experiences in high school seem to be of limited value; standardized test scores provide general guidelines, but the best prediction is performance in accounting courses -- and this information comes too late for the student who is trying to decide between enrollment in Accounting 66 or Accounting 1A. In fact, the writer wonders if the needs of students who take accounting could be met more adequately by having less prerequisites and regimentation. At any rate, the current procedures certainly do not seem too productive, and improvement in the performance of students may not be a function of additional standards. The merit of the alternative to prepare new guidelines or modify those currently in existence can be derived from this study. However, it would seem more appropriate that accounting instructors, who are more knowledgeable in this area, should judge which factors would be the most helpful and devise guidelines accordingly.

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